FIELD GUIDEBOOK

to

ENVIRONMENTS OF COAL FORMATION

IN

SOUTHERN FLORIDA

Trip Leaders

William Spackman

David W. Scholl and William H. Taft

Printed for the

GEOLOGICAL SOCIETY OF AMERICA

PRE-CONVENTION FIELDTRIP

November 16, 17, 18, 1964

ENVIRONMENTS OF COAL FORMATION
IN
SOUTHERN FLORIDA

INTRODUCTION*

Accurate interpretation of the ecological significance of geologically ancient sediments has been inhibited in many areas by a lack of detailed information on the relationships between sediment type and depositional environment. Recognition of this fact has led to the recent increased effort devoted to the study of "modern sediments" and has stimulated publication of data on a variety of sediment types. The Proceedings of the First National Coastal and Shallow Water Research Conference provide an insight into the scope of these research efforts (Gorsline, 1962).

In spite of this increased interest in recent sediments, few investigators have focused their studies on the plant derived deposits that represent the progenitors of coal seams. There are exceptions to this including geochemical studies (e.g. Swain, Blumentals and Miller, 1959), geological studies as represented by that of Fisk (1960), palynological studies of investigators motivated by the needs of the oil industry as exemplified by the work of Kuyl, Muller and Waterbolk (1955) and those motivated by interests in post-glacial climatic and vegetational history (e.g. Dansereau and Segados - Vianna, 1952; Potzger, 1953). Even with the data provided by these and similar studies, it remains difficult, if not impossible, to attach an accurate paleoecological description to

* Portions of this Guidebook are taken from Spackman, W., C.P. Dolsen and W. Riegel, Phytogenic Organic Sediments and Sedimentary Environments in the Everglades-Mangrove Complex, Part I: Effects of the Transgressing Sea on Environments of the Shark River Area of Southwestern Florida. (Accepted by Paleontographica for publication in 1965.)

the individual lithobodies that compose coal seams of Tertiary and older strata. This not only minimizes the amount of ecological information to be derived from the study of the coal seam, but it also confounds attempts to correlate seams. Detailed stratigraphic and paleogeographic reconstructions are also difficult to develop because of a lack of knowledge on the botanical and geological significance of the lithotypes encountered in the coals of coal measure sequences.

The Atlantic and Gulf Coastal Palins of eastern United States contain a variety of swamp and marsh environments in which the progenitors of coal substances are forming. These include the Dismal Swamp region of Virginia and North Carolina, the Okefenokee Swamp of southern Georgia, the inland swamps and related lakes and marshes of central and north-central peninsular Florida, and the river swamps of the Florida panhandle. Each of these areas appears to possess the potential of yielding information useful in interpreting the significance of Tertiary coal sequences. The panhandle river swamps contain a remarkable number of the floristic elements represented in such deposits as the mid-Tertiary Brandon Lignite (see Barghoorn and Spackman, 1950). In certain environments in Okefenokee Swamp the peat appears remarkably similar to many of the European brown coals in color, texture and phyteral content. If a mass of this material were to be dehydrated it would be difficult to differentiate it from a "woody" brown coal. The geologic settings associated with the Okefenokee area and with the deltaic river swamps render these comparable to many of the swamps that contributed to the development of at least some of the Tertiary coal sequences. The numerous and varied environments in central and north-central Florida can provide much information that will prove critical in recognizing certain of the more uncommon coal types. The sapropel deposit and underlying 30 feet of peat in Mud Lake near Ocala, Florida and the woody, fibrous and amorphous peats of the Lake Isotokpoga area are of particular significance in this connection.

However, the vast Everglades, occupying much of peninsular Florida from Lake Okeechobee southward, are also of considerable importance in view of the apparent significance of these environments in such brown coal sequences as those of Germany (Thomson, 1950; Teichmuller, 1958).

In southernmost Florida this Everglades area is fringed by a mangrove forest that attains its best development on the southwestern coast in the vicinity of the Shark River. Because this southwestern sector of Florida is now a National Park, it has been modified by agricultural practices to a lesser degree than the area between the Tamiami Trail and Lake Okeechobee. Inspection of the National Park area will make evident that (1) the plant communities involved are relatively simple in composition and comparatively few in number, (2) several environments are rather readily recognized and environmental boundaries appear sharp as opposed to gradational, and (3) six to fifteen feet of peat can be found beneath the mangroves, the saw grass of the Everglades and the "hammocks" or "heads" that occur as "tree islands" in the open saw grass sea. It can be argued that the limestone substratum upon which the peat lies and the general geologic setting render these sites unlike those commonly represented in coal measure sequences. This is true to a certain extent, for it is difficult, to say the least, to envision how an underclay could develop beneath these peats. However, it is probable that the influence of the sub-peat strata becomes less and less significant as the swamp plants find themselves rooted in peat alone. Moreover, the conditions present in this region make it possible to compare similar environments and peats as they have developed on substrata composed of different mineralogical composition and to examine the effects of burial beneath a cover of quartz sand on the one hand and marine or fresh-water marl on the other. Nevertheless, until it is shown that the limitations imposed by the dynamic geologic history of peninsular Florida are insignificant, it must be emphasized that the data presented may have meaning only for the particular types of geologic setting involved as opposed to being generally applicable.